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RECEIVED
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MONO COUNTY PLANNING DEPT.
SOUTH COUNTY

**SUBJECT: REVIEW OF KEITH W. EHLERT'S REPORT TITLED
"FAULT AND SEISMIC INVESTIGATION FOR
PROPOSED RESIDENTIAL DEVELOPMENT, TRACK 37-16
MONO COUNTY, CALIFORNIA"
DATED AUGUST 27, 1999**

Dear Gerry,

In accordance with our proposal dated September 27, 1999 and your authorization to proceed on January 6, 2000, a review of the subject report and a brief reconnaissance of the site discussed in the subject report have been completed. The guidelines presented by the California Division of Mines and Geology's (CDMG's) Note 49, the State Board of Registration for Geologists and Geophysicist (1993) and the State Mining & Geology Board (1996) (see attached copies) were used as general criteria for an acceptable fault and seismic hazard assessment investigation and report. This letter provides general comments on the technical content in the subject report. This letter also presents recommendations Mono County may wish to forward to the appropriate party to resolve those issues or concerns that remain in the subject report.

In his report, Ehlert correctly pointed out the closeness of the White Mountain Fault Zone to the subject development, that the White Mountain Fault Zone has been historically active and has been designated an Alquist-Priolo Special Studies Zone by the CDMG, and that a major earthquake could occur on the fault in the future. In his conclusions, Ehlert reminds the reader of "... the considerable risk associated with any site located in, or in close proximity to, an active fault zone." He also correctly stated "...the risk of ground ruptures...can be reduced by avoiding building across known active or potentially active faults, the possibility of ground rupture occurring anywhere in proximity to an active fault cannot be ruled out." It is commendable that Ehlert and his client have extended their fault hazard investigation beyond the boundaries of the CDMG's Alquist-Priolo Special Studies Zone, to investigate breaks in slope that might be the surface expression of the splays and/or subsidiary faults that could extend out side of the special studies zones. Further, Ehlert's concludes that "it is likely, the greatest damage resulting from an earthquake in the site area will be from severe ground shaking and possible permanent ground deformation" seems appropriate, but only as long as adequate building set backs are provided from the active near surface traces of the fault zone.

Based on the information provided in his report, it was difficult to either concur or dispute Ehlert's conclusions that *"No faults were identified in the exploratory trenches. As such, it does not appear the proposed structures will be constructed across fault traces."* or his conclusion that *"The White Mountain Fault is capable of producing at least a 7.1 magnitude earthquake."* and *"Peak ground accelerations of 0.6g or higher could be anticipated."* Answers to the following questions would help the reader either contest or concur with these stated conclusions.

1. In addition to the Alquist-Priolo map of the area, what additional references were reviewed for the investigation? Usually references are cited that support statements in a report and an appropriate reference list is usually included.
2. Normally stereo pair aerial photographs are analyzed for the presence or absence of lineaments that might be the surface expression of active faults. These are then utilized to position the subsurface investigation trenches. Were aerial photos analyzed, and if so, who took them, and what date and time were they flown? Has a lineament map been prepared? The lineament map and the photos. They should be made available for a reviewer's independent assessment.
3. It is difficult, if not impossible, to review conclusions regarding the presence or absence of faults or their level of activity based on trench logs with out having the opportunity to view the exposures in the trench with the log. Given that the trenches have already been backfilled, a discussion of the procedures and methods of how the trenches were logged, provides a means of assessing the level of accuracy in the conclusions. Normally, fault investigation trenches are thoroughly cleaned and logged in detail by geologists working down in the trenches. Although the vertical scale is not clearly indicated on the logs, if the vertical scale is the same as the horizontal scale, trenches of the depths indicated by law must be appropriately shored for safety to allow the geologists into the excavation for close, detail inspections of the geology. It was not clear how the logging was done.
4. Detecting fault traces in coarse gravel to bouldery alluvium can be difficult and sometimes impossible. Based on a review of the surface of the trench sites after the trenches were buried, the clasts in the back fill appeared to be flat or platy rather than rounded, thus they should have laid reasonably parallel to the bedding planes in the alluvium, possibly somewhat imbricated (shingling), but should provide reasonable markers for use in fault detection if carefully inspected and documented. This pattern appears faintly on the logs which would indicate the lack of faults in the exposed material. But locally, such as near stations 150 in trenches 3 and 4, the clasts are shown as highly disturbed, such as might occur if they were distributed by a displacing fault. It is not clear, based on the lack of detail in the logs, what these disrupted patters in the orientations of the clasts mean.
5. It is stated that Trenches 1, 2, 3 and 5 were excavated across breaks in the slope. It is difficult to concur with this statement based on the poor quality of the topography on the map provided on Plate 1 of the report. Based on a field review, it appears that trench 5

did not extend across a significant break in slope further to the west. In addition, there are significant gaps between Trench 2, 3 and 4. The more significant of these gaps can be seen between Trench 3 and 4, where a faint drainage line indicates a "dog-leg" which is often a surface clue to the presence of a fault. However, in this case the shift in the stream appears to be left lateral, not consistent with a right lateral sense of the White Mountain Fault. Possibly this shift in the drainage may be induced by the apparent normal component of displacement. The trenches do not cover this anomaly in the drainage pattern.

6. Even the lack of visible traces of a fault in the trenched alluvium, does not preclude the presence of subsurface active faults that are potential surface fault rupture hazards, because young alluvium can cover active fault traces. Therefore, a fault hazard assessment must have some measure of the age of the material either offset by a fault or not offset by a fault in order to assess the potential hazard. No age information on the material exposed in the trenches is provided in the report.
7. No supporting information is provided with which to evaluate the reasonableness of the maximum earthquake and ground acceleration estimates. Usually a discussion is provided on the seismic characteristics of the active fault and the procedures used to estimate maximum magnitude and ground motions so that an independent reviews can be completed.
8. It seems prudent to note in the report that the July 21, 1986, Magnitude 6.1 Chalfant Valley Earthquake caused rupture on the White Mountain Fault Zone, including in the area near the site (see attached reference).

In conclusion, although the Ehlert report correctly points out the significant seismic hazard at the proposed development site, the report does not provide the details normally presented with a fault hazard assessment report, so that an independent review can be done. Therefore, it is not clear that the conclusion "... no active faults trend through the site." can be supported.

Sincerely,

URS Greiner Woodward Clyde

S. Thomas Freeman
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CEG 1015

